

a treatment plan. Some medications, such as atropine, are also used to facilitate eye examinations (see the Master the Essentials table for descriptions of the most common medications for disorders of the eye).

A CLOSER LOOK: Eye Health

Good eye health requires that patients have their eyes assessed annually. Family practitioners should encourage their patients, particularly older patients, to see an ophthalmologist or optometrist annually. These specialists use a **tonometer** to measure pressure in the eye. If pressure builds in the eye, it is usually because the aqueous humor is not flowing out of the eye correctly. This causes intraocular pressure (IOP) to increase. Pressure on the optic nerve eventually can lead to blindness.

Medications for Glaucoma

Glaucoma is a leading cause of blindness. In this disease, an increase in pressure in the eye damages the optic nerve and thus impairs its ability to transmit visual information from the eye to the brain. Glaucoma is actually a group of diseases. Primary open-angle glaucoma, the most common form, occurs when the eye's **Schlemm canal** (drainage tube for aqueous humor) becomes obstructed, thus leading to a gradual increase in pressure. This disease traditionally has no symptoms, and if not diagnosed, it can cause loss of vision. Primary open-angle glaucoma is routinely treated effectively with medications, especially when it is diagnosed early.

Another type of glaucoma is angle-closure, also known as acute or narrow-angle, glaucoma. This type is rarer, and it differs from open-angle glaucoma in that eye pressure usually increases very rapidly. Angle-closure glaucoma occurs when drainage is obstructed, but at a different place in the eye. The iris is usually too small, and it covers up the drainage canals. Symptoms of this type of glaucoma include headache, eye pain, nausea, multicolored halos around lights at night, and blurred vision. Angle-closure must be corrected surgically.

A third type of glaucoma is called normal-tension glaucoma. As the name implies, the optic nerve is damaged even though the pressure in the eye is not elevated enough to indicate this likelihood. The patient has no symptoms, and diagnosis is made only by examining the optic nerve for damage. Because the cause of this type of glaucoma is still a mystery to physicians, treatment consists of lowering the pressure in the eye as much as possible through medications or surgery.

A few other types of glaucoma fall into an “other” category. These include congenital glaucoma, in which an infant is diagnosed early with increased pressure resulting from a hereditary congenital malformation or abnormal fetal development. Secondary glaucoma is secondary to another disease that causes or contributes to increased eye pressure or is a result of injury or certain medications. Some medications, such as glucocorticoids, antihypertensives, antihistamines, and antidepressants, can predispose a patient to increased **intraocular pressure (IOP)** because of a decrease in aqueous humor flow in the eye. In many cases, this is temporary and subsides with discontinuation of the medication. In a few rare instances, it is permanent. Pigmentary glaucoma results when the pigment granules giving the eye its color break off and lodge in the drainage system.

Miotic and prostaglandin medications treat glaucoma by increasing the flow of aqueous humor. Miotics include drugs such as pilocarpine HCl (Isopto Carpine, Pilocarpine HCl Ophthalmic Solution USP), carbachol (Isopto Carbachol), and pilocarpine HCl gel 4% (Pilopine HS Gel). They also constrict the pupil. Some of these drugs activate cholinergic receptors, which decrease the IOP. They dilate the meshwork of the Schlemm canals, and allow increased output of aqueous humor. As more aqueous humor is absorbed, the IOP decreases.

Prostaglandins such as bimatoprost (Lumigan), latanoprost (Xalatan), and travoprost (Travatan Z) do not affect pupil diameter but rather dilate the meshwork in the anterior chambers of the Schlemm